# PDR RID Report

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| **Document** | PDR | |

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| **Section** N/A | **Page** N/A | **Figure Table** N/A |
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**Category Name**   Design                                    **Actionee**   HAIS

**Sub Category**

**Subject**      Support of Non-TDRSS Data Links to the S/C

**Description of Problem or Suggestion:**

Non-TDRSS communications paths to the EOS Spacecraft exist for contingency and backup purposes for EOS AM-1, and may be prime for subsequent EOS spacecraft. Examples are the DSN and GN S-band links for TT&C, and the X-band direct playback link for science data. Nowhere in the design were objects presented which addressed these non- TDRSS links. Yet, they must be in place at the time of the EOS AM-1 launch. While the objects affected may appear obvious, it is not clear that such identifications had been made, or that the work was included in the necessary scope. Further, the ramifications of using these alternate data paths extend back into other sections of the design (e.g., using X-band instead of TDRSS changes the scheduling paradigm from schedulable downlink times to physically predetermined downlink times). Such effects were not presented, nor were their impacts.

**Originator's Recommendation**

Do, or show, the work. Present a complete preliminary design prior to CDR, including the above items (n.b., the end-to-end review in February may provide an appropriate forum).

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**GSFC Response by:**                                        **GSFC Response Date**

**HAIS Response by:**     D. Herring                         **HAIS Schedule**    1/13/95

**HAIS R. E.**     A. Miller                           **HAIS Response Date**    1/26/95

Scheduling - The PDR presentation focused on the nominal AM-1 Operations Concept which uses TDRSS for communication contacts. However, the design includes the capability of using ground stations for contingency reasons, and therefore there will be no impact if ground station contact scheduling is required. Currently, the only ground sites that have been established are DSN, WTS and GN, and their interface is handled through the NCC. To plan these contacts on AM-1, the FDF will send the EOC availability times for DSN, WTS and GN. The EOC interfaces with the NCC to schedule the services for these ground station contacts. If additional ground sites are later established for communication contacts, the design provides the option of (1) having the FDF generate the availability times and send them to the EOC or (2) having the EOC generate the availability times based on the ground station location, spacecraft ephemeris and other parameters. Once availability times are generated, they can be displayed on the timeline to aid the FOT in establishing their desired contact times. For scheduling the communication services with ground sites that are not handled through the NCC interface, an ICD between the ground site and the EOC would need to be established to incorporate the electronic interface into the design. For contingency reasons, the EOC may utilize the services of a ground station in which no ICD has been established. The EOC will interface with this site in a more manual mode (e.g. telephone, e-mail or fax) until an electronic interface is established through an ICD.

The PDR Design documentation details the following information:
1) The class for modeling the availiability times for DSN, WTS, GN or other ground station is FpRmGroundStation (p. 5-12, fig. 5.1.2.1.1-1)
2) The class representing a communication contact to a ground station is FpRmGroundStationAct (p. 5-16, fig. 5.1.2.1.2-1)
3) The class for performing the scheduling of a communication contact for ground stations (in addition to TDRSS) is FpScCommContactScheduler (p. 5-24, fig. 5.1.2.2.2-1)

Realtime - The FOS interface to the EOS Spacecraft is via EDOS, including contingency systems. The FOS objects for communicating with the spacecraft are specified in the FOS Design specification section 6.2.2 (the FoCmUplinkStream object) for commanding and section 6.3.2 (the FoGnTlmEdosIF object) for telemetry. The command object provides the capability to send commands at the required 125bps, 1kbps, 2kbps, and 10kbps rates to EOS Spacecraft. The information required to communicate through the forward link with regard to the spacecraft are encapsulated in the FoCmUplinkStream object and are defined in section 6.2.5. Receipt of S-band data at the FOS is via EDOS in the form of EDOS Data Units containing CCSDS data packets. X-band science data is not received by the FOS from EDOS.

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| **Status**   **Closed** | **Date Closed**   **2/1/95** | **Sponsor**   **Johns** |
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